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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/086,942

03/01/2002

Cem Basceri

MI22-1951

3748

21567

7590

11/04/2002

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EXAMINER

HUYNH, YENNHU B

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 11/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/086,942	BASCERI, CEM	
	Examiner	Art Unit	
	Yennhu B Huynh	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 43-60 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 43-60 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>5 & 7</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 1-42 have been cancelled by Amendment filled on 3/1/02.

Claim Objections

Claims 43-54 are objected to because of the following informalities: the limitation --first region--, --second region--, and --third region-- should be changed to --first layer-- or --first edge region--; --second layer-- or --second edge region--; --and --third layer-- or --third edge region--.. The term region is too broad and indefinite. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

~~A person shall be entitled to a patent unless --~~

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 43 is rejected under 35 U.S.C. 102(b) as anticipated Summerfelt et al.

(U.S. 6,362,068B1)

Summerfelt et al. at figs. 1-5 in related art col.1-8 disclose a capacitor dielectric materials of BST, which include a first capacitor electrode 30; a first perovskite type dielectric material layer 32; wherein the second layer having a different amount of crystallinity than the first layer (col. 3 & 4, lines 55-4); a second capacitor electrode 46 over the perovskite type dielectric material.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 43-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Summerfelt et al. (U.S. 6,362,068B1) in view of Sone (U.S. 6,323,057B1).

Summerfelt et al. at figs. 1-5 in related art col.1-8 disclose a capacitor dielectric materials of BST, which include a first capacitor electrode 30; a first perovskite type dielectric material layer 32; wherein the second layer having a different amount of crystallinity than the first layer (col. 3 & 4, lines 55-4); a second capacitor electrode 46 over the perovskite type dielectric material. Summerfelt also disclose a BST thickness of 100nm (10 angstrom) and a ST of 53nm (col.3, lines 30-32) or a variety thickness of BST or ST (table 1, table 2, col.2, col. 6); the first layer has less crystallinity than the second layer (col.6, lines 43-48); a third perovskite type dielectric material layer 36; wherein the perovskite type material comprises Ba, Str, Ti and oxide; wherein the perovskite type material has different chemical composition in the second layer than in the first layer (col.3, lines 17-17-43); wherein the perovskite type material comprises one or more BST, BT, PZT and lantalum doped PZT (col.1, lines 44-61); wherein the capacitor electrode layers comprises a metal Platium.

However, Summerfelt et al. do not disclose the first layer is substantially amorphous and the second layer is substantially crystalline.

Sone in related art col. 1-12 and figs. 1-12 disclose a thin film capacitor, which include forming a perovskite amorphous film on the bottom electrode, and a crystallized film is formed at the second step due to heat treatment; wherein the perovskite material comprises Sr, Ba, Pb, Ti, Zr, and La (col. 5, lines 31-37).

It would have been obvious to one having skill in the art at the time the invention was made to combine the teaching from Sone's process in using an amorphous perovskite material film formed on a Platinum capacitor electrode, to provide a good surface evenness for the bottom electrode, and make a sufficiently high relative dielectric constant to reduce leakage or improve the capacitor performance, into Summerfelt et al.'s process. This modification would complete the capacitor constructions comprising perovskite type dielectric materials as claimed invention.

With respect to claim 44 the time, concentration, cycles and thickness are considered to involve routine optimization while has been held to be within the level of ordinary skill in the art. As noted in re. Aller, the selection of reaction parameters such as temperature and concentration would have been obvious.

"Normally, it is to expected that a change in temperature, or in range, concentration, cycles, thickness, would be an unpatentable modification. Under some circumstance, however, changes such as these may be impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality ... More particularly, where the general conditions of a claim are disclosed in the prior art, it is

not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller 105 USPQ233, 255 (CCPA 1955). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmischer 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

Response to Arguments

Applicant's arguments filed 8/22/02 have been fully considered but they are not persuasive.

Contrary to the Applicant 's argument in Remark 8/22/02 is about :

- 1) Claim objection with the term "region" be replaced with "layer" throughout (page 2).
- 2) Summerfelt et al. do not disclose the layers differ in crystallinity relative to one another, but describe a correlation between a dielectric constant of material and the leakage current, and do not disclose the changes in crystallinity can also influence and control leakage current (pages 3 & 4).

Applicant 's attention is respectfully directed to:

- 1) In the specification the term "first edge region" or "layer" is used in correspondence each other to indicate of a same location and function (as example: layer 122, page 8). The specification does not support the claims with the term "first region". The term "region" is too broad and indefinite. Therefore the claim objection has been re-suggested as the above.

2) Summerfelt et al. do not disclose an crystallizing to the dielectric layers, but Sone discloses the crystallizing to the dielectric layers by a two step deposition process. Therefore, the dielectric layers is crystallized in two different thickness and formed on two edge regions, one region is on the lower electrode and the other relative one is further away from the first edge region, which adjacent to the top electrode and extremely even (col.1& 2, lines 64-38), wherein the interface region between this is unevenness (col.9, lines 16-24). The repeat crystalline dielectric film will change of amount of crystalline structure when the crystallizing has grain structure and the dielectric film are arranged in irregularly structure, thus crystalline amount is different in the dielectric region (col.11, claim 11).

Sona also disclose the changes in crystallinity can influence and control leakage current, by forming a small roughness in one side of the dielectric film has and relative to one other side has evenness, which as a result of the leakage current and breakdown voltage are improved (col.4, lines 6-16).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yennhu B. Huynh whose telephone number is 703-308-6110. The examiner can normally be reached on M-F 8.30AM-7.00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, can be reached 703-308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

YNBH,

2/27/02


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800